Commodity Derivatives and Risk Management
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Lecture 38
Hedging Freight Rate Risk with Freight Rate Derivatives

Hi all, welcome to this session on commodity derivatives and risk management and if you recall we were discussing about different aspect of this index creation that is a freight index creation, which gets reported by the Baltic Exchange.

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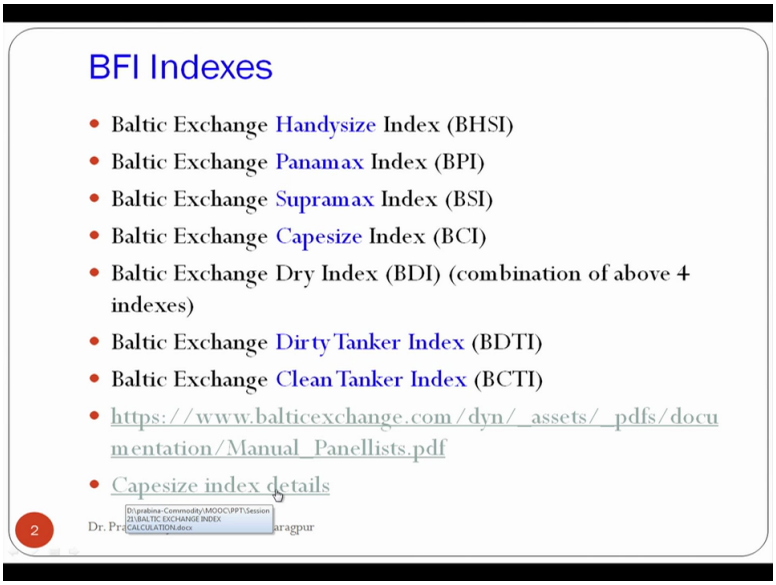

And if you recall, we discussed these different indices and I was discussing about the capsize index detail and this as you I mean as if you can recall this, we discussed that for a particular index, you will have different routes which has been identified by the index committee and besides the routes, the actual price quotation that is the rate at which shippers and charterers are renting out ships in these in these routes are collected from the ship brokers. And who are these ship brokers, Baltic Exchange capsize index panelist. If you can see this is the panelist which has already been identified by the Baltic Exchange as the panelist who are going to give their price information to the exchange for calculation of your capsize index. Now, let us take an example to see how this is calculated. It's a simple calculation but let us spend couple of minutes.

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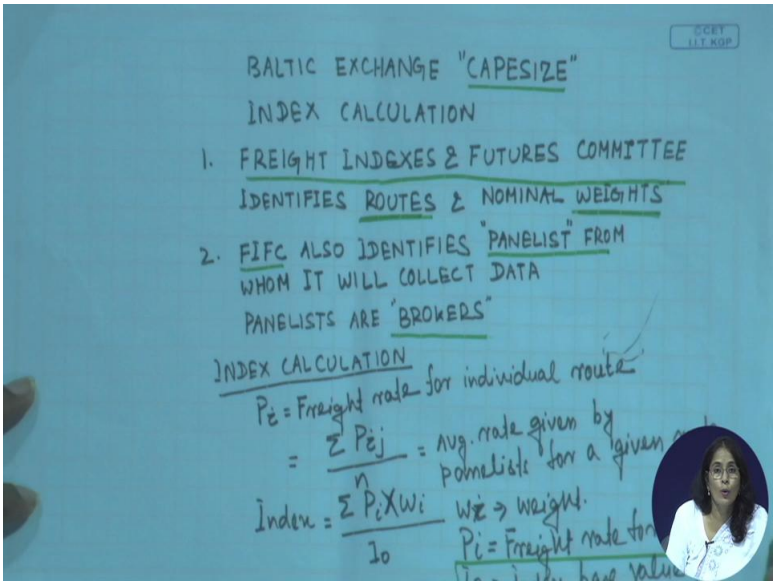

So if you can see this is the Baltic Exchange capsize index calculation, so which a body calculates freight indexes and futures committee. Every exchange has a committee, which responsibility is to identify the routes, which routes will be part of the index and what are the weights associated with these route routes. So this FIFC that is Freight Index Futures Committee also identifies the panelist from whom it will collect data so that also I have already shown, and please note that these panelists are the brokers, ship brokers, these are not the actual charterers or the ship owners. So these panelists are the brokers who are aware of what is happening in the underlying market. They have more information than a one particular charterer or a one shipper.

So a charterer who is interested in only may be in interested in sending or importing or exporting goods in a specific route. They may be having information with respect to that particular route but a index is calculated not only for a specific route, index is calculated for all routes. so or index is calculated by taking a price information pertaining to all routes so that is the reason why Baltic Exchange does not take any price information from the charterer or the shippers.

Now, how the exactly the index calculation, it is a simple calculation. it is a you have P i so this is the freight rate for individual route but for a individual route, let us say you have out of 10 panels the exchange received information price information for a from 7 panels. So this P i will then be nothing but the average rate given by the panels for a given route so it is simple average. If a particular route out of 10 panelists, the exchange has received 7 price

information, so that is going to be averaged out to identify the price associated with the particular route.

And similarly if you if you remember for a Capesize may be around 15 routes are there so there are it is mentioned, 4 routes are mentioned here. It will be around 10, 12 routes are will be there, if you see this document, you will be able to identify how many routes are there so each route has a weight. So this so what is going to be the index value? Index value is nothing but the summation of P i into W i that is price of 1 route into weight of that route and summation of that and divided by index base value, so this I 0 is not but nothing but your index base value. So this is how exactly the Baltic Exchange calculates the index for all indices which we just discussed.

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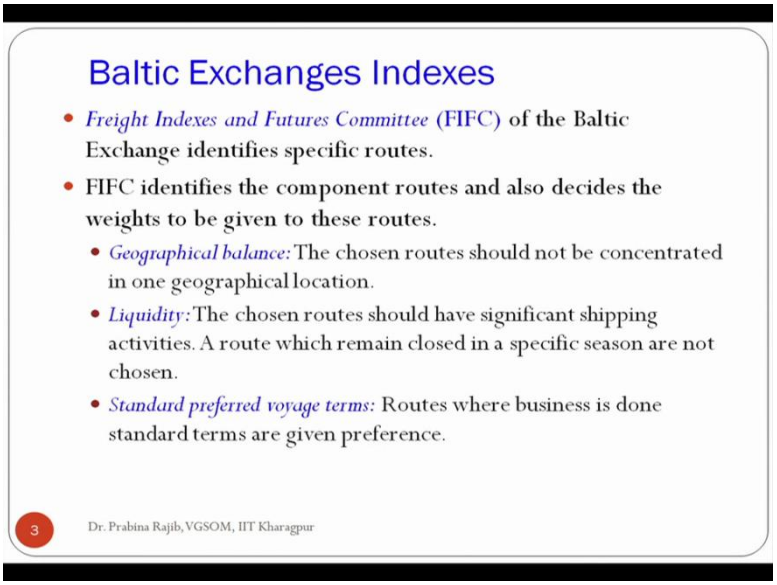

Now, the next question which you may be thinking that how does the FIFC that is your Freight Index Futures Committee decides which routes to choose. So it is again is a same dilemma when some 5000 companies are listed in a in a stock exchange and company the exchange committee identifies only 50 companies to represent the index, it is the same mechanism through which the routes are identified. So the routes are identified with respect to geographical balance that means the chosen groups should not be concentrated on a specific on in 1 geographical location, it should as widely disbursed as possible.

And second, another very important criterion is the Liquidity. The chosen route should have a the chosen route should have a significant shipping activity, so when a index represent the broader underlying market then the route should have enough shipping activity otherwise that

route should not be Incorporated into the index. And the final is the standard preferred voyage terms. So it becomes if the route has a standard preferred voyage term so all participants whenever they are quoting a price, so the exchange knows that price is with respect to a particular standard specification. Otherwise, if different ship brokers are offering different rates or giving different rates with respect to different shipping conditions, then probably that is not a proper way of calculation of the index.

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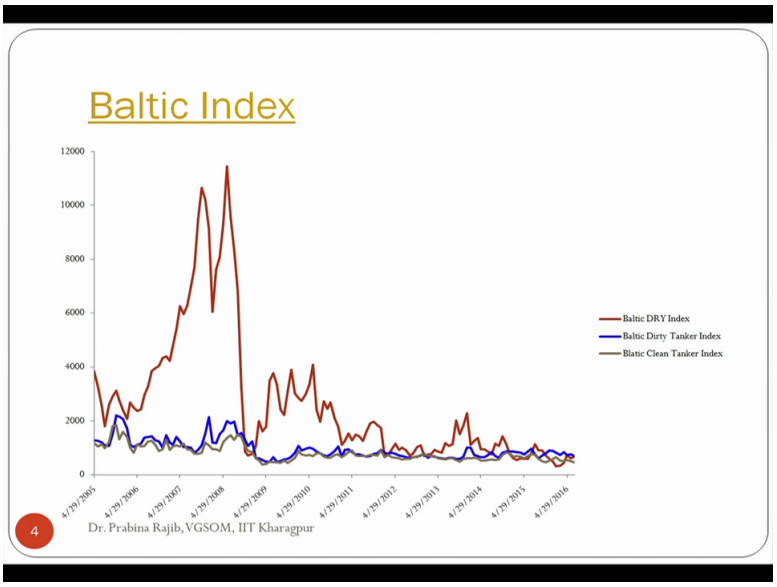

So, all these 3 factors go into consideration for calculating the index and the index calculation methodology, as we have already discussed. Now let us go to this is again I downloaded the data from the Bloomberg database and please see this one. This is the Baltic index, this is the top one is your Baltic dry index and the red color, this thing is Baltic dry index. The blue one is the Baltic dirty tanker index and brown color line is your Baltic okay there is a spelling mistake on my part; this will be Baltic clean tanker index.

And if you can see if you can this Baltic dry index which represents the global trade in a significant way so that picked up during 2008 and it significantly dropped down and it is hovering at a almost below the index initiation value, index started around 1000 in the year 1985 and it is quoting around let me take you to the data.

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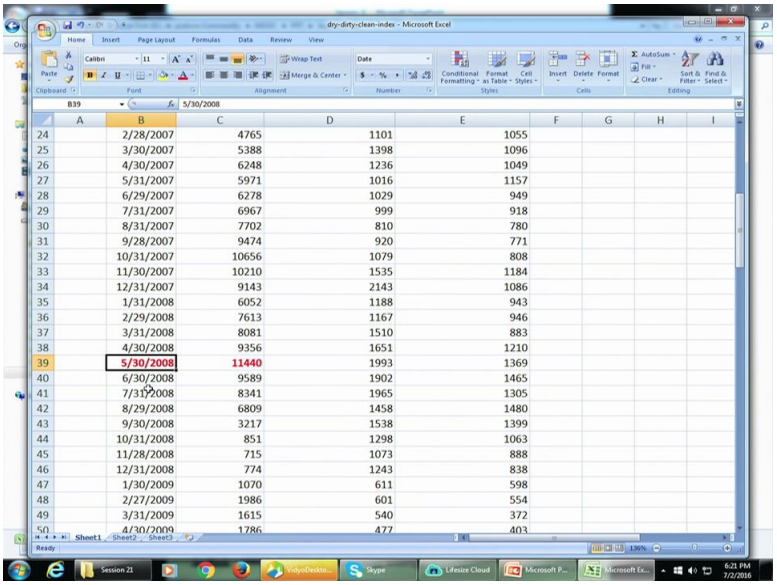

	A	B	C	D	E
24		2/28/2007	4765	1101	1055
25		3/30/2007	5388	1398	1096
26		4/30/2007	6248	1236	1049
27		5/31/2007	5971	1016	1157
28		6/29/2007	6278	1029	949
29		7/31/2007	6967	999	918
30		8/31/2007	7702	810	780
31		9/28/2007	9474	920	771
32		10/31/2007	10656	1079	808
33		11/30/2007	10210	1535	1184
34		12/31/2007	9143	2143	1086
35		1/31/2008	6052	1188	943
36		2/29/2008	7613	1167	946
37		3/31/2008	8081	1510	883
38		4/30/2008	9356	1651	1210
39		5/30/2008	11440	1993	1369
40		6/30/2008	9589	1902	1465
41		7/31/2008	8341	1965	1305
42		8/29/2008	6809	1458	1480
43		9/30/2008	3217	1538	1399
44		10/31/2008	851	1298	1063
45		11/28/2008	715	1073	888
46		12/31/2008	774	1243	838
47		1/30/2009	1070	611	598
48		2/27/2009	1986	601	554
49		3/31/2009	1615	540	372
50		4/30/2009	1786	477	403

Yes, if you can see this data, this data show you have on that, it is a monthly data of 30th May 2008. Baltic dry Index picked it went to 11440 and as on the last date, that is the 1st July 2016 it is hovering around 677. And all of the economic recession and economy going down, not much of the activity is happening all over the world and um in fact the Baltic Exchange is considered to be a precursor to the economic activity so lot of people keep note of what is how the Baltic Exchange is moving. If it is going up then they know that next quarter or subsequent 2 quarter later economy the economic reports are going to be showing positive indication in terms of the GDP growth rate etc so it's a leading indicator or these indices are leading indicator of the economic performance.

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Now, besides this a Baltic Exchange, Shanghai exchange also calculates and reports a Containerized freight index and if the methodology is same, it takes the spot rate of or the rates identified rates quoted by ship brokers for 15 designated routes and these routes which are they cover sea routes between Shanghai, Europe, Shanghai US east and west coast and Shanghai to Asia and Shanghai to Asia and Shanghai to Africa and Shanghai to Australia. Basically all trades which export-import is happening between China and other part of the world through container ships, this index represents that particular market.

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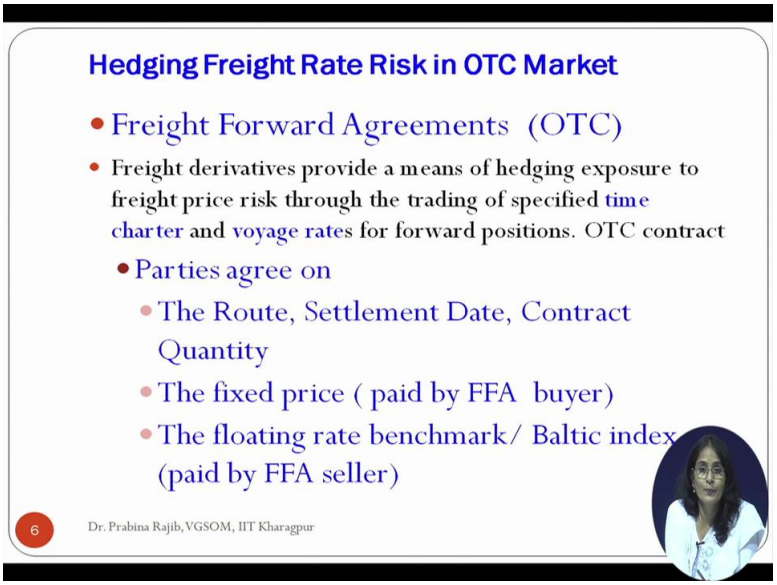

Now, let us go to our understanding on how these forward indices are used for hedging freight rate risk and what we are going to discussion is a OTC contract through futures and options are traded in the in a CME, but majority of hedging happens in the OTC market that is the market which is associated with the Baltic Exchange. Now, let us take an example, what exactly is the freight forward agreement so in case of a freight forward agreement, it is a hedging instrument in which charterers and shippers enter into a contract for a specified time charter and voyage rates for forward position so let me repeat. It is a derivative contract; it provides a mean of hedging, and the exposure to freight price risk through trading of specified time charter and voyage rates for forward position.

So what exactly happens, that is let us say um both parties have some views with respect to whether charter these freight rates are going to go up or go down. Let us say a shipping company fears that that this freight rates are going to go down and it can enter into a forward contract for mitigating that risk and it fixes the price at which it will be able to lease or rent its ships through the freight forward agreement. Similarly, let us say a charterer fear is that

the price is going to go up. If he does not do anything and to mitigate that price risk associated with freight rate, it can enter into a forward contract in which it will pay a fixed rate for every voyage or every series of voyage, it will be it is interested to undertake.

Now, what will be the contract terms, it will be the route, the settlement date, the contract quality, who is going to be the fix price player and who is going to be the fixed a floating price payer. In fact if you recall, it is nothing but a swap agreement so it is basically some party will be selling the swap and some party will be buying the swap so predominantly this happens in the OTC market. Now, let us take an example how this how this freight forward works in real life.

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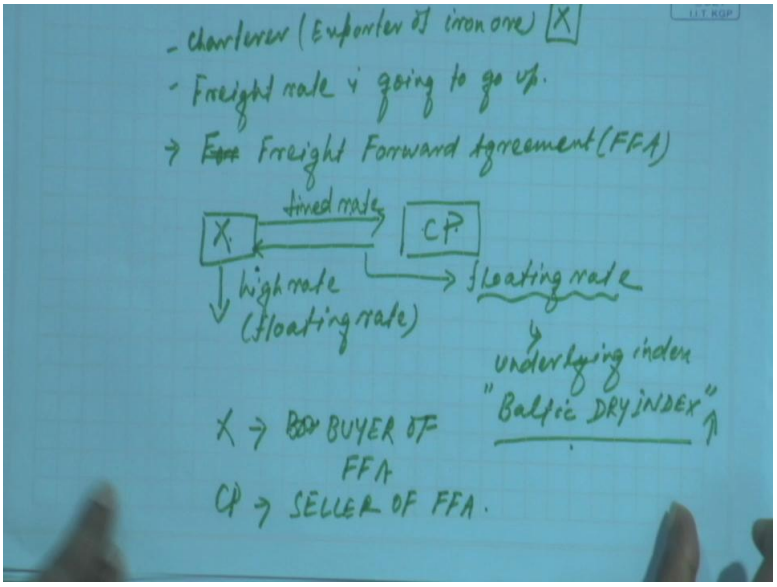

Now, let us say you have a charterer, a charterer or let us say exporter of exporter of iron ore and what is the its fear, its fear is freight rate is going to go up and how it will be able to mitigate that risk, it enters into a freight forward agreement. It enters into a agreement that is your FFA so in that case, what the charterer will do, so the charterer will be let me name him a X, so what is X fear, X fear is that he is going to be a high rate or a floating rate.

When he actually hires or enters into a time enters into a voyage charter or a contract of affreightment, he has to pay a higher rate and how he can mitigate this particular risk, price risk by entering into a freight forward contract, he will be agreeing to pay the fixed rate and he will be receiving a floating rate and who is the counter party?

Let us say counter party is we name him, name the counter as CP, and X will pay fixed rate to the CP and CP will pay a floating rate on which is that floating rate, floating rate is nothing

but your underlying index let may be let us say that is your Baltic dry index. So if Baltic dry index has gone up let us say and this index value has gone up and the charterer fear has come true, he will be paying fix rate to the counter party and he will be receiving a fixed, he will be receiving a floating rate which is the higher dry index value and simultaneously when he goes to the to a shipper for a time for a contract of affreightment or a or a voyage, he will be paying a higher rate.

So this is an example of a freight forward agreement and in this case, this in this is a swap contract and X by paying a fix rate, X is a buyer of X is buyer of FFA and CP is seller of and let us go to the we will take another example where the shipper is fearing that the freight rate is going to go down which is the case right now. In fact the shipping rate also is very strongly related, not only with the economic activity, it is also related with the crude oil price. So if crude oil price goes down, the bunker cost goes down and the shipping rate also accordingly goes down, so the shipping company fears that price is going to go down, how he will be mitigating the risk. Let us see we were naming the shipping company as a SC. SC's fear is price, price, when I am using the word price, it, I am meaning it is a freight rate is going down so how he will be mitigating this respect to FFA.

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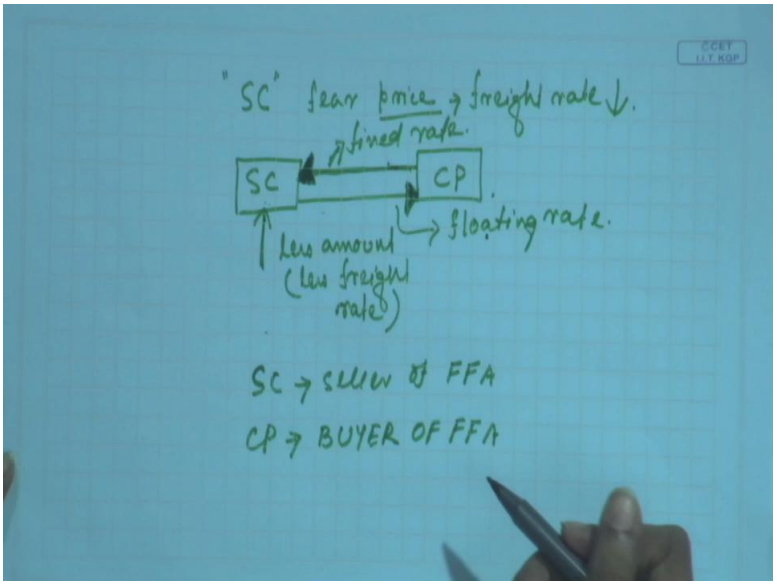

So what is the SC, SC's fear is it will be receiving less amount that is, freight rate goes down so less freight will prevail and it will receive freight or rate. So how he will be able to mitigate this risk so it would be interested to so let us say we have a counter party here, so you will have SC will be paying the floating rate and SC will receive fixed rate from the counter party. So let me repeat so SC's fear is that it is going to receive less amount of freight

rate if it does not do anything. Now, how he will be how this company will be able to mitigate this risk, it will enter into a freight forward agreement for some period of time into the future may be 6 months or 8 months depending upon the expectations.

So it will be receiving the it will be receiving fixed rate from the counter party and it will be paying the floating rate, so if his fear is true, he will this company SC will pay less rate to the counter party and the counter party will be paying a will be paying a fixed rate to the Shipping Corporation of India. I am sorry; the counter party will be paying a fixed rate to whoever is the shipping company. So this is an example where you have your SC that is your shipping company is the seller of the FFA and the counter party is the buyer of the as you remember you have a buyer is a party, which pays the fixed so in this case, CP is paying the fixed amount to the shipping company hence CP is the buyer of the FFA and SC is the seller of the FFA.

And all these buying and selling of FFA is done through a OTC market, but this particular market is cleared at I mean all these transactions are um cleared at the exchange platform, that is your Baltic Stock, Baltic Exchange Platform so buyers FFA , buyers and FFA sellers will be giving their bid and ask quotations, order matching will happen, when order matching happens, the counter parties will take position and payment and receipt with respect to this FFA contracts are executed through the Baltic Exchange infrastructure.

So with this, I would like to end up this session on the freight derivative. Also I would like to add couples of lines here in the sense that, these freight futures are also available for trading at CME and all underlyings are Baltic indices. So the um for forward contracts have the sorry, the futures contract have the underlying for different indices Baltic indices which we discussed. And with this, let me summarize what we discussed with respect to the freight rate.

We discussed what the wet cargo is. What is the difference between wet cargo and a dry cargo, what are the different types of a cargo ships and depending upon the dead weight size, depending upon whether they are carrying um carrying a dry cargo or liquid cargo and how um how your um Baltic Exchange calculates different indices and based on these indices, how freight forward agreements are undertaken by the shippers um as well as the charterers to mitigate the freight price risk.

With this I will be proceeding with the next part of our discussion that is a spot market for our water. So this is also again another innovative trading which is happening in exchanges

so I will just in very briefly, I will discuss what a spot market for water is and how water trading is happening in the through exchanges.

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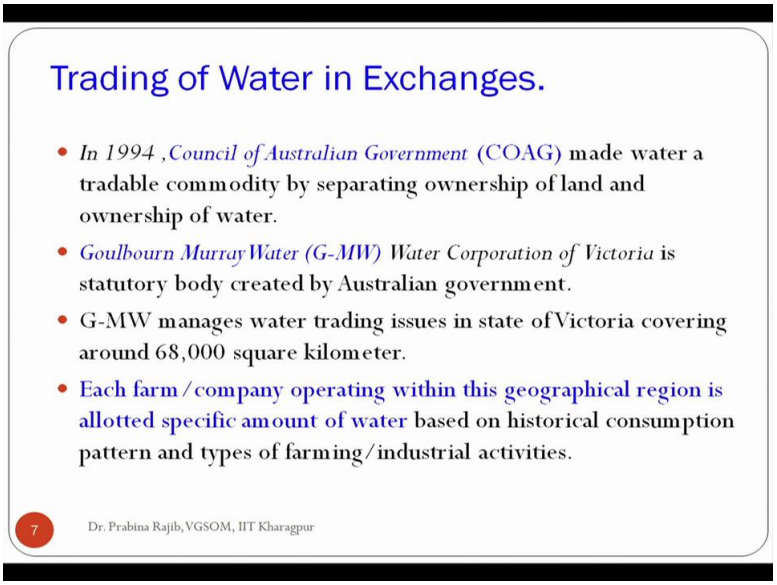

Uh please all of you may be knowing that um the water is going to be the next major scarce resource for all of us considering the urbanization and the amount of a per capita water consumption which is increasing day by day, we are and all of us we know that we are staring at a major water crisis. So now in certain exchanges, water contracts have started trading. I will just give a case study with respect to how water is being traded at Australia, some part of the Australian subcontinent.

Uh please note that during 1994, council of Australian Government made water as a tradable commodity by separating the ownership of the land and the ownership of the water. So that means if somebody owns a piece of land and there is a water body, there is a pond or there is a lake then the water is not owned by the person. The water is owned by the government, it is the government ownership, water is not privately owned so in that case in with respect to this so Australian um the government, council of Australian Government created a corporation called Goulbourn Murray Water Corporation of Victoria and it became a statuary body which was created by the Australian Government and this GM G-MW manage the water trading issues in the state of Victoria covering around 68000 square kilometers.

So all firms and all um animal a firms which were rearing animals and firms who are into farming different agri farm products, they require water and water is a scarce commodity over there so what basically this Goulbourn Murray Water Corporation did is that it gave

some X amount of water freely available to each and every um company which is operating. Let us say in that within the 68000 square kilometer, you have 5 companies operating and depending upon these 5 companies business.

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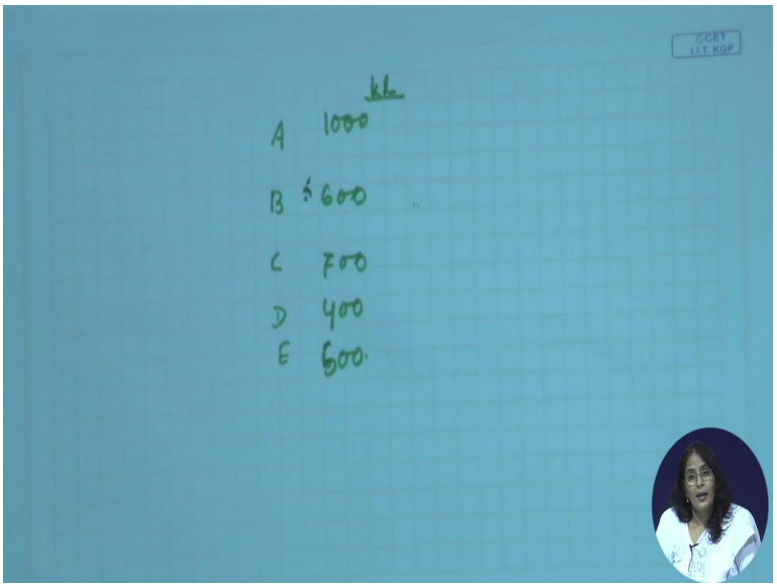

Let us say let us say this company had sorry 5 companies are operating, A, B, C, D, E and depending upon the availability of the water, let us say in a 1000 kiloliters, kiloliters of 600, 700 kiloliters, may be 400 kiloliters and 500 kiloliters were freely distributed to these 5 um um they have the right consume, I should not say freely distribute, they have a right to consume this much of kiloliters of water depending upon their existing business size.

So A has the maximum amount 1000 kiloliter available to him. Now, A can if A decides utilize less water in its day to day operation for running the business, A can sell this water to the other 4 parties, so how A will be able to sell the water, A goes to the exchange platform and A does a auction and based on the auction, whoever is the highest bidder, whoever is willing to pay more money, that party gets the right to use the amount of a water which has been sold by A. Now, how it will be executed? They like a electro grid system, all these water bodies are connected to a grid, so A will release whatever the amount of water it agreed to sell it to the counter parties, A will release that much of water to the grid and um the counter party will extract that whatever amount of water it bought from A, that amount of water, it will extract from the grid.

Now, what is the risk associated with it, suppose A has underestimated its water requirement and A has already sold it to the counter party and counter party has already utilized what

amount of water, then A will be facing water scarcity and its business operation may take an hit.

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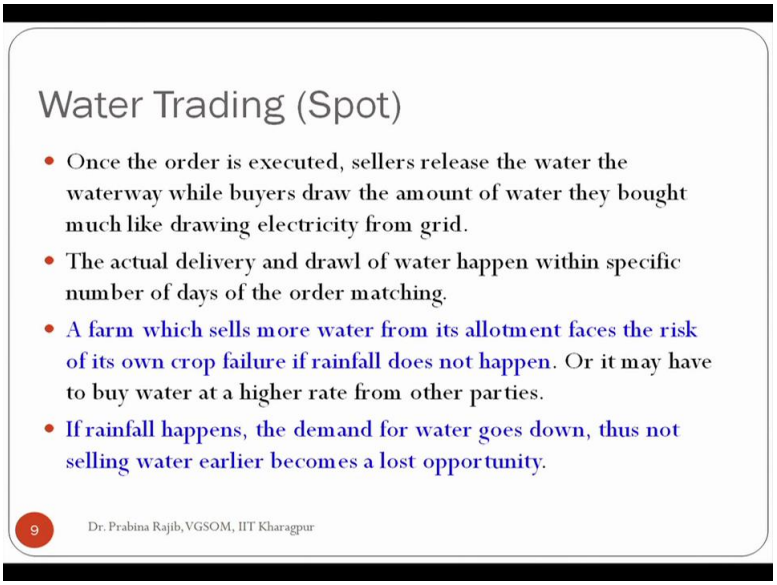

Uh and suppose if rainfall happens and A did not A has sold it and if rainfall happens and everybody got um A's water requirement is not high enough so A gains from this particular transaction and if rainfall does not happen and A has already sold it, then A may face the risk so how exactly this order matching is happens, please see this one. This buyer and seller give their bid and order is matched by this Goulbourn water Authority and all buy and sell bids are collated and order are matched and accordingly, buyers buy buyers consume more water and sellers get more money through this particular transaction.

Of course, there is no derivative contract, futures contract not yes started to be traded but I do not think there is much time left sooner or later, we will have some exchange where um the consumers, bulk consumers of water and may be municipalities will be able to enter into forward contracts or future contract for a delivering water and consumer water at a later point of time and the price is decided at a early stage, like in a forward or futures contract. So with this, I will like to end up my discussion and again we will be continuing with remaining part of the discussion in the subsequent classes thanking all of you.